FINAL ENVIRONMENTAL ASSESSMENT
CASPIAN TERN NESTING ISLAND CONSTRUCTION PROJECT
CRUMP LAKE
WARNER VALLEY
LAKE COUNTY, OREGON

INTRODUCTION

This Final Environmental Assessment (EA) addresses restoration of an island in Crump Lake in the Warner Valley of south central Oregon to provide nesting habitat for Caspian terns *(Sterna caspia)*. Development of alternative nesting habitat locations for Caspian terns, in conjunction with social facilitation measures, is intended to reduce the number of these birds nesting in the Columbia River estuary, thereby reducing their predation on juvenile salmonids. For the period 2001-2005, Caspian terns consumed an estimated 4.2 million juvenile salmonids annually from the Columbia River estuary.

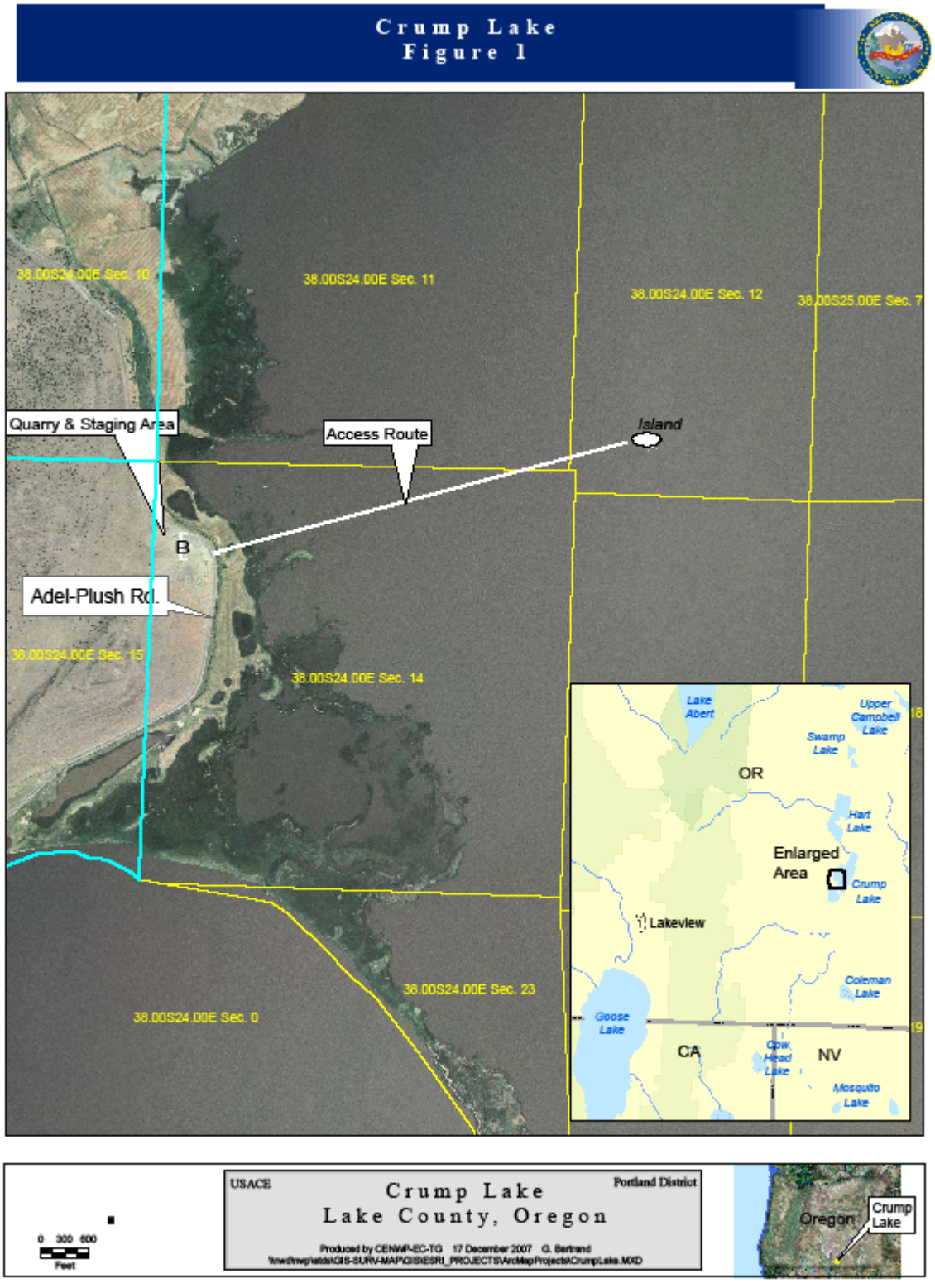
Crump Lake is located approximately seven miles north of Adel in Lake County, Oregon (Figure 1). The project is located in the central portion of Crump Lake, north of the peninsula that nearly bisects the lake. The original island now proposed for restoration was partially dismantled by artifact hunters circa the 1950's and then was subsequently eroded by wave action. The island had supported colonial nesting birds from at least 1911. By 1977, this island was only a small remnant. Consequently, the Oregon Department of Fish and Wildlife (ODFW) proposed to rebuild and stabilize it while the lake was dry. Lack of funds and then lack of dry conditions delayed reconstruction until 1992. ODFW used approximately 7,500 cy of lakebed material and 418 cy of rip rap rock to restore the island. Unfortunately, the material placed to restore the island (lake bed sediments with rock protection on the perimeter) did not hold, and the island again has again eroded to an elevation below the lake full pool elevation. Consequently, use by colonial nesting birds only occurs when lake levels have dropped several feet below full pool.

PURPOSE AND NEED

The purpose of this action is to implement one element of the environmentally preferred management alternative as identified in the Corps' November 22, 2006 Record of Decision (ROD) that adopted the 2005 *Caspian Tern Management to Reduce Predation of Juvenile Salmonids in the Columbia River Estuary, Final Environmental Impact Statement* (FEIS; USFWS et al., 2005; https://www.nwp.usace.army.mil/pm/e/en_plan_avian.asp). The need for the proposed action is to reduce the predation related loss of juvenile salmonids in the Columbia River estuary attributable to Caspian terns.

To assist accomplishment of the stated purpose and need, the Corps proposes to construct approximately one acre of nesting habitat for Caspian terns and, in combination with social attraction measures, attract migrating Caspian terns to Crump Lake, Oregon. Social attraction entails use of Caspian tern decoys and playback of recorded Caspian tern colony vocalizations to attract Caspian terns to a location.

Figure 1. Location map for Caspian tern habitat development and island restoration, Crump Lake, Lake County, Oregon.



Caspian Terns

Increases in the number of Caspian terns nesting in the Columbia River estuary over the past decades led to significant concerns in the mid-1990s over their potential impact on the recovery of threatened and endangered Columbia River salmonids (salmon and steelhead). Based upon research results that documented substantial annual juvenile salmonid losses (12.4 million juvenile salmonids in 1998; Collis et al., 2006a), the Caspian tern nesting colony was shifted over the period from 1999-2001 via habitat management and social attraction actions from Rice Island (Columbia River mile 21) to East Sand Island (Columbia River mile 6) in order to diversify the diet of Caspian terns and lessen the number of juvenile salmonids consumed. Management efforts were also initiated and continue annually each spring to preclude their establishment of nesting colonies at the upper estuary locations of Rice, Miller Sands, and Pillar Rock Islands. This effort at upper estuary islands precludes Caspian terns from consuming higher numbers of juvenile salmonids compared to terns nesting at East Sand Island.

From 2001 to 2005 the average number of Caspian terns nesting at East Sand Island was approximately 9,108 pairs and they consumed an average of 4.72 million salmonid smolts annually (Collis et al., 2006b). Thus, a substantial savings in juvenile salmonids, approximately 6 to 7 million juvenile salmonids annually, was achieved by this initial management action. However, a considerable number of juvenile salmonids are still consumed by Caspian terns. Consequently, additional actions were considered necessary to reduce juvenile salmonid predation by Caspian terns (USFWS et al., 2005).

As a result of Caspian tern management actions proposed in 2000, Seattle Audubon, National Audubon, American Bird Conservancy, and Defenders of Wildlife filed a lawsuit against the Corps and the U.S. Fish and Wildlife Service (USFWS) alleging that compliance with the National Environmental Policy Act for the proposed action of attracting the large colony of Caspian terns from Rice Island to East Sand Island was insufficient and objecting to the potential take of eggs as a means to prevent tern nesting on Rice Island. In 2002, all parties reached a Settlement Agreement that stipulated that the USFWS, Corps, and National Marine Fisheries Service (NMFS) prepare an EIS to address Caspian tern management in the Columbia River estuary and juvenile salmonid predation. The FEIS was completed in January 2005. Records of Decision for the FEIS were issued by the USFWS (lead agency) and Corps in November 2006.

The FEIS identified a management plan for Caspian terns in the Columbia River estuary that will reduce impacts to ESA-listed salmonids while ensuring the conservation of Caspian terns in the Pacific region. The RODs by the USFWS and Corps adopted a modified Alternative C, the preferred alternative in the FEIS, which would reduce tern predation on juvenile salmonids in the Columbia River estuary by managing habitat to redistribute a portion of the tern colony on East Sand Island throughout the Pacific Coast region. The modification to the preferred alternative eliminated further consideration to the development or enhancement of tern nesting habitat at Dungeness National Wildlife Refuge in northwestern Washington due to National Marine Fisheries Service concerns over impacts to listed salmonids in Puget Sound (NMFS 2006).

The redistribution of Caspian terns outlined in the FEIS would be achieved by creating new or enhancing existing tern nesting habitat in Oregon and California and ultimately reducing the tern nesting site on East Sand Island to approximately 1.5 to 2.0 acres. To ensure a suitable network of sites is available for terns on a regional scale, the FEIS proposed to construct/enhance 2 acres of nesting habitat for every 1 acre of nesting habitat that would be eliminated on East Sand Island. The six alternative habitat locations identified as sites for Caspian tern nesting habitat development included Fern Ridge Lake, Summer Lake, and Crump Lake in Oregon, as well as three locations in

San Francisco Bay. The proposed action described in this EA is expected to provide nesting habitat for Caspian terns at Crump Lake and thereby aid the redistribution of the Columbia River estuary Caspian tern population.

Crump Lake currently only supports an intermittent population of Caspian terns. The following text provides insight into the presence of colonial nesting birds at Crump Lake. Nesting by colonial nesting birds at Crump Lake has occurred at least since 1911. American white pelicans were the principal nesting species then and their nesting history there is probably indicative of Caspian terns and other colonial nesting birds that frequently share nesting islands in this region. In 1972, there were about 500 nesting pairs of American white pelicans using Crump Lake. However in 1983 the number had reduced to 95 nesting pairs and then abandonment occurred that June due to high water. By 1987, there was no use of Crump Lake by colonial nesting birds and the lake was dry or partially dry in 1990 and 1992. Nesting by white pelicans has traditionally occurred at three locations in Crump Lake: two colonies at the north part of the lake and one near the middle part. Water levels have determined which colony sites have been used. The north two islands were used during high water when what is normally a peninsula, becomes an island. The middle island was partially dismantled by artifact hunters circa the 1950's and then was subsequently eroded by wave action. By 1977, this middle island was only a small remnant. Consequently, ODFW proposed to rebuild and stabilize it while the lake was dry. An initial lack of funding and the subsequent lack of dry conditions delayed restoration of the island until 1992. ODFW used approximately 7,500 cy of lakebed material and 418 cy of rip rap rock to restore the island. Unfortunately, the material placed at the middle island (lake bed sediments with rock protection on the perimeter) did not hold sufficiently, and the island has again eroded to an elevation below the lake full pool elevation. An elliptical remnant of the island remains with dimensions of approximately 351 feet by 99 feet (0.63 acres) with an elevation approximately two to three feet above the lakebed. Consequently, use by colonial nesting birds only occurs when lake levels have dropped a few feet below full pool and portions of the island are exposed.

Nesting by Caspian terns in south central Oregon is sporadic in nature due to fluctuating water levels and availability of suitable nesting islands. Approximately 150 pairs nested at the middle island location in Crump Lake in 2000. High water levels precluded nesting by Caspian terns there in 2001-2002. Researchers from Oregon State University/USGS constructed a 16'x 24' wooden platform in May 2003 when rising water levels covered a previously exposed portion of the island. They placed Caspian tern decoys and a sound system playing recorded tern colony vocalizations at the platform site and were successful in attracting 49 pairs to the platform location and attaining fledging of young terns from the site. Another 22 pairs established late nests (mid-June) on recently exposed portions of the middle island.

OSU/USGS researchers determined that tui chubs comprised approximately 53 percent of the Caspian terns diet in 2003; centrarchids (27%) and catfish (15%) represented the other important prey resources. One Warner sucker was observed out of 1,378 prey items brought to the Caspian tern colony.

Fisheries resources at Crump Lake are considered more than adequate to support a nesting population of Caspian terns. Crump Lake supports a large population of native tui chubs and introduced black and white crappies, along with other sunfish species, brown bullheads and the federally-listed native Warner sucker. Red-band trout, a native species, are also present at Crump Lake and tributary streams.

Other bird species expected to use the Crump Lake Island for nesting include American white pelicans, egrets, cormorants, great blue herons, and gulls. Most of these species currently nest on an island in Pelican Lake near Adel, Oregon.

PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The proposed action entails restoration of an approximately one acre island, at the crest, for Caspian tern nesting habitat in Crump Lake, Oregon and, in combination with social attraction measures, attracting migrating Caspian terns to Crump Lake. An existing island, typically inundated when Crump Lake is full, would be restored and slightly enlarged from the remnant that currently remains. The elliptical shape of the remnant island would be retained.

The proposed action at Crump Lake represents the second implementation action for the preferred action as identified in the FEIS and subsequent RODs by the USFWS and Corps. A similar nesting island at Fern Ridge Lake near Eugene, Oregon is anticipated to be constructed just prior to the proposed island at Crump Lake. Alternatives consideration was completed during the development of the FEIS (USFWS et al., 2005), which was programmatic in nature.

Habitat Construction

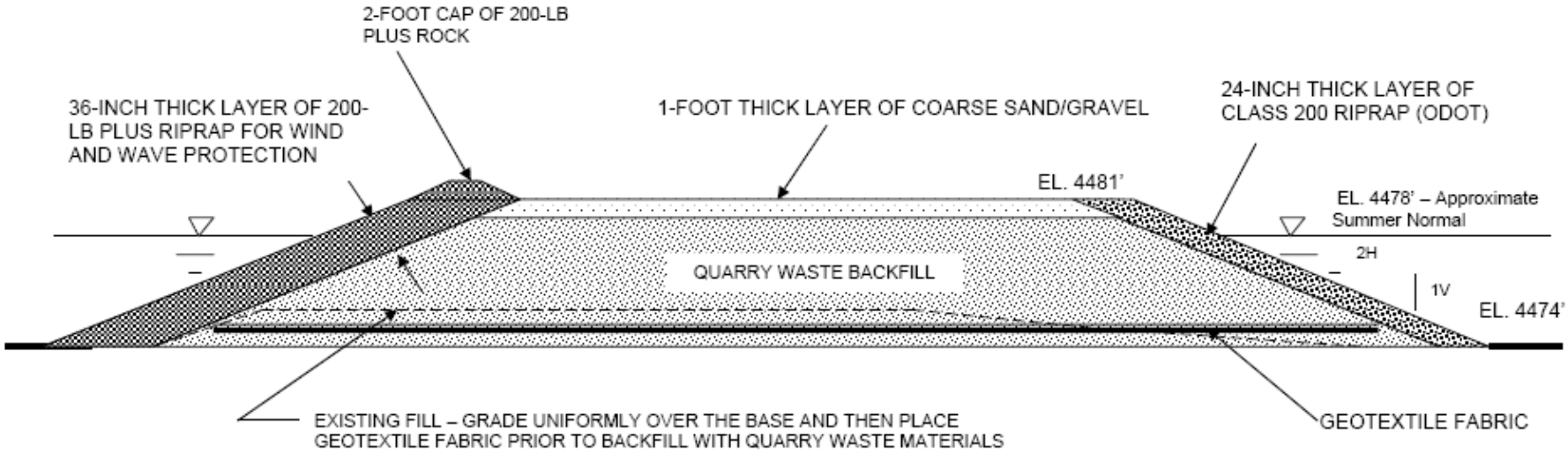
The island proposed for restoration at Crump Lake is located in the southwest quarter of Section 12, Township 38S, Range 24 E (see Figure 1). The elliptical remnant of the existing island has approximate crest dimensions of 351 feet by 99 feet (0.8 acres) with an approximately 2-3 foot elevation rise above the lakebed (Figure 2). The proposed restored island would have an elliptical base dimension of approximately 384 feet by 170 feet (1.38 acres) and would rise approximately nine feet above the lakebed to ensure exposed surface exists at high water conditions (Figure 3). The crest dimension of the restored island would be approximately 347 feet by 165 feet or roughly 1.0 acres given its elliptical shape. Side slopes would be constructed at one foot vertical to two feet horizontal.

The existing island would be extended on the north or lee side to attain a surface acreage of approximately one acre; prevailing winds are from the south. Geotextile material would not be placed atop the remnant island and lakebed surface as a foundation for placement of material as stated in the draft EA. Geotechnical field observations determined it was unnecessary. No leveling of the remnant island is expected to occur during initial construction. The entire perimeter of the island would be protected by a two foot thick or greater layer of rip rap (~2340 cy) from wave and ice erosion. The remnant portions of the island along with the extension to the north would be raised to the target elevation using quarry waste (~10,700 cy) obtained from a local quarry. A 1.5 foot thick layer of coarse sand/small dimension gravel (~2500 cy) would be placed atop the quarry waste to provide a nesting substrate for Caspian terns. The surface material would be of sufficient size to preclude wind erosion under most conditions. The quantities of material listed in the Final EA are slightly higher than those projected in the draft EA.

At the present time, due to prevailing dry conditions, Crump Lake in the vicinity of the island location is virtually dry. The lakebed portion of the access route as of early December 2007 was dry for approximately ¾ of its length and had less than one inch of water covering the balance of the route to the island. A site visit in mid-January revealed a frozen lakebed with approximately 2-3 inches of ice atop the lakebed substrate near the island and a skim of snow elsewhere. Consequently, the Corps proposes to haul the rock materials (quarry waste, rip rap and coarse

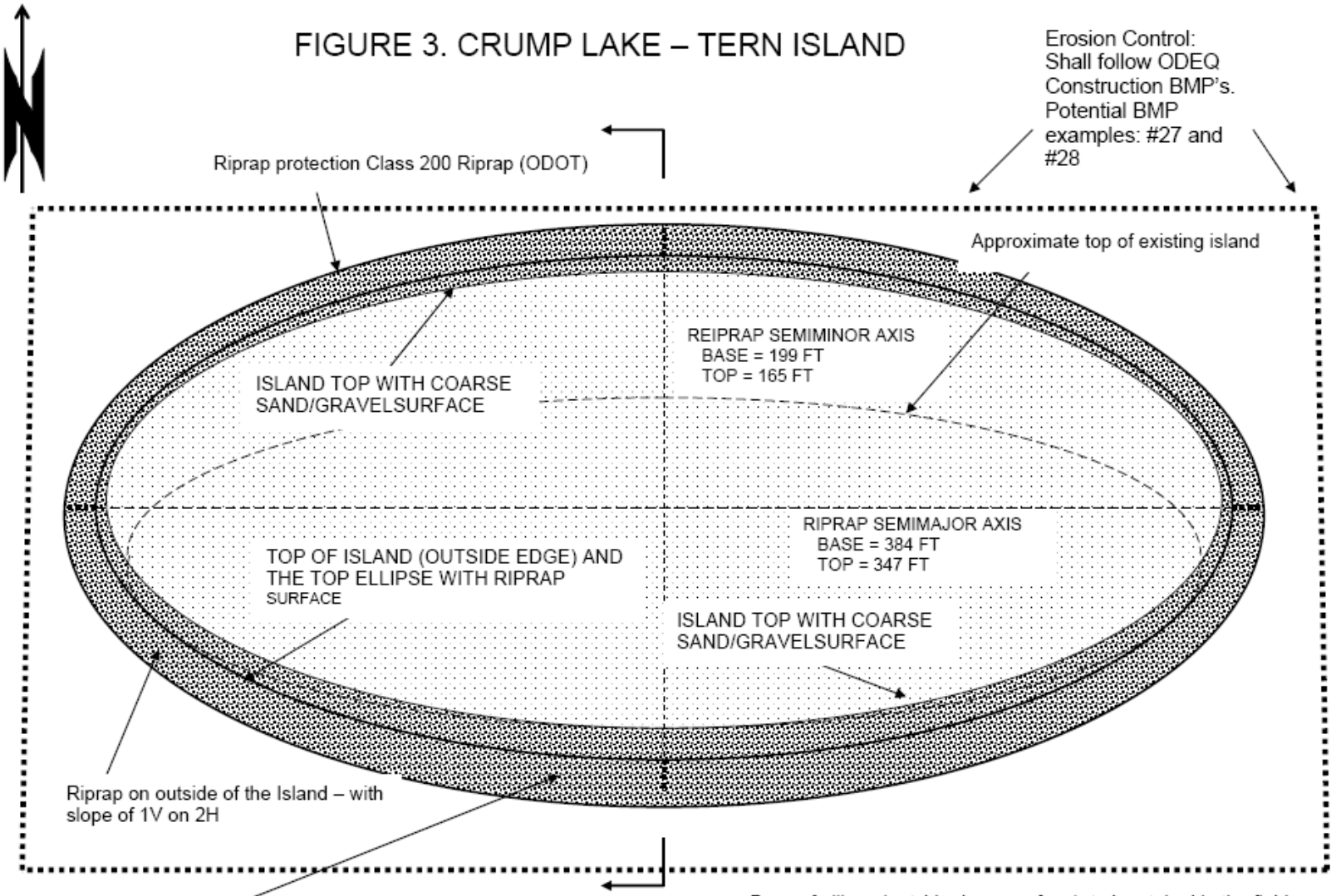
sand/gravel for nesting substrate) for restoration of the island via truck to the site for placement, leveling and compaction. The haul road would proceed in a straight line in a slightly northeasterly heading from the quarry location. The haul road location was modified from the draft EA to reduce use of the county road, number of turns and total distance, thereby facilitating construction. A 20 foot wide by approximately one mile length temporary roadbed would be constructed on the lakebed from the shoreline of Crump Lake to the island location. The temporary roadbed would consist of a layer of BX1200 geogrid, a 12 inch layer of quarry waste, another layer of geogrid and an additional 12 inches of quarry waste. Lesser volumes of rock may be used if the lakebed is frozen. Geofabric may be placed on the ground surface first to prevent migration of fines from the lakebed into the haul road. Four pullouts, each 20' x 150', will be located along the haul road. The haul road would be removed to the extent practicable upon completion of the island. Lesser volumes of rock may be used if the lakebed is frozen.

FIGURE 2. CRUMP LAKE – TERN ISLAND



ELEVATION VIEW
NTS

FIGURE 3. CRUMP LAKE – TERN ISLAND



PLAN
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Base of ellipse (outside riprap surface) to be staked in the field but semimajor and semiminor axes are 384 feet and 199 feet, respectively.

The Top ellipse (outside riprap surface) has semimajor and semiminor axes of 347 feet and 165 feet, respectively.

All rock materials necessary for restoration of the Crump Lake Island are available at a local quarry located in the northwest corner of Section 14, Township 38S, Range 24 East. Impacts are assessed for this local, previously opened quarry although final selection of a quarry would be dependent upon materials price.

A narrow section of private land currently used for grazing cattle (upland pasture) and containing an irrigation canal lake ward of the quarry and county road would have to be crossed to access Oregon Department of State Lands (ODSL) property. A culvert will be emplaced and a road crossing will be established over the privately owned irrigation canal. ODSL owns the lakebed and some adjacent lands at Crump Lake. The ODSL portion of the access route runs slightly northeeast from the private property directly to the island location. For approximately 100 feet from the edge of the upland to the barren portion of the lakebed the access road would run through an emergent marsh zone.

Island construction is targeted for February-March 2008 to take advantage of the current dry lakebed and wintertime freezing temperatures. This would greatly simplify the construction effort over a full lake condition when material and equipment would have to be barged via shallow draft vessel to the island or constructed in another manner. A full lake condition would entail considerably more cost and effort, potentially including development of a rudimentary on/off loading facility such as a rock fill bulkhead extending from the lake shoreline to water of sufficient depth for barges to access.

The proposed island location is approximately one mile distant from the lake's perimeter vegetation zone. The specific island site is characterized primarily by bare ground when exposed except for scattered herbaceous plants and a small clump of willows that have pioneered onto the remnant island in recent years.

AFFECTED ENVIRONMENT

General

The land and water areas of Crump Lake are the property principally of the Oregon Department of State Lands. Wetlands and adjacent upland areas are typically managed passively. Cattle grazing does occur on adjacent uplands and evidence suggested that cattle have access periodically to the perimeter of the lake.

Soils

Lakebed Soils

The Soil Survey of Lake County, Oregon, Southern Part (United States Dept. of Agriculture and Natural Resources Conservation Service, 1990 survey), describes the Crump Lake soil profile as black muck overlying black silt overlying very dark grayish brown silt loam. The soil is very poorly drained and very compressible.

Island Remnant

The original island soils are more sandy with silt and some gravel. After the original island was sifted and then pushed back together, approximately 2 to 12-inch rock was placed around the perimeter as riprap. Wave and ice action has eroded the existing island.

Quarry Materials

The quarry material that will be used for the new island fill is a mixture of cobbles, gravel, sand, and some fines. The cobbles and gravel are angular to subrounded in shape, indicating a combination of talus and river deposits.

The larger rocks in the quarry, identified as Steens basalt, will be used for the riprap surrounding the new island. Roughly half the basalt is vesicular. Rocks up to 200 pounds will be used for riprap on the east, north, and west sides of the island, while rocks greater than 200 pounds will be placed on the south side facing the prevailing winds.

A pile of black, coarse, crushed sand located at the quarry will be used for the top foot of the island.

Sediment/Water Quality

The sediment and water quality of Crump Lake are anticipated to reflect local conditions. No major industrial or urban centers are located in the watershed that would serve as a source of pollutants. Coliform bacteria arising from human presence is likely very low due to the very low and dispersed population base and relatively limited recreational use in the area. The input of coliform bacteria from livestock is probably minimal due to the dry climate which would limit transport to the lake. Local agricultural activities associated with native hay and alfalfa production require none (native hay) or limited inputs of fertilizers and herbicides compared to row crops, and in conjunction with the arid nature of the basin are unlikely to result in much agricultural runoff to Crump Lake. Water temperatures would be anticipated to increase in summer due to prevailing weather conditions and may be exacerbated during periods of low lake levels. Turbidity in Crump Lake may rise seasonally due to snowmelt runoff and wind generated wave erosion of native soil materials.

Vegetation

The proposed island restoration location is located approximately one mile from the lakes shoreline and is surrounded by bare ground during extremely dry conditions and water during most lake stages. A narrow zone (approximately 100 feet) of emergent vegetation is present along the lake shoreline at the location to be bisected by the haul road. Wider areas of emergent marsh vegetation are present elsewhere along the lakes shoreline. One small clump of pioneering willows and some herbaceous plants are present at the island restoration location. The access road, from the county road to the lakebed access point will cross pastureland, typically vegetated with native grasses and short shrubs.

Fish and Wildlife Resources

Several species of colonial waterbirds and shorebirds use Crump Lake. These include American avocet, black-necked stilt, willet, common snipe, California gull, ring-billed gull, double-crested cormorant, Forster's tern, Caspian tern and American white pelican. Some of these species may

compete for nesting habitat with Caspian terns. Waterfowl nesting occurs in the fringing marsh and upland habitat. Their use of the lake also occurs during spring and fall migration. As drawdown lowers the water level and then exposes the lakebed, wading birds and shorebirds would be expected to be more prevalent until winter freeze up. The lake supports little wildlife use when dry and during winter freeze up. The fringing marsh is anticipated to support a number of songbird species during the spring and summer nesting period. Bank swallows have a colony located on the face of stockpiled, small dimension gravels and sands at the adjacent quarry location. A number of terrestrial songbird and reptile species are expected to be present at the local quarry location.

Mammalian use is principally associated with the shoreline – emergent marsh zone. Muskrats are present; other furbearers are expected along the shoreline. Mule deer, coyotes, various small mammals and other terrestrial species would occur on lands adjacent to the lake. Mammalian use of the lake proper is anticipated to be very low.

Crump Lake supports naturally reproducing populations of introduced bluegill, black and white crappie, brown bullhead, and largemouth bass. Native fish inhabiting the lake include redband trout, tui chub and Warner sucker. Tui chub are still abundant whereas redband trout and Warner sucker populations are greatly reduced from historic levels. Warner suckers are currently listed by the USFWS as threatened.

Nonnative piscivorous fishes were stocked into the lakes in the 1970's. Ratios of crappies and brown bullheads have increased since the early 1990's and dominate the catch. In 2001, 87% of the fish captured in Hart Lake and 92% of the fish captured in Crump Lake were nonnative (information derived from http://oregonstate.edu/dept/ODFW/NativeFish/WarnerSucker.htm).

Information on redband trout was derived from the Oregon Native Fish Status Report (Volume II) located at http://chinook.dfw.state.or.us/fish/ONFSR/final/08-redband-trout/rb-methods-warner-lakes.pdf. Redband trout appear to be distributed throughout the perennial streams and lakes of Warner Valley as conditions permit. Distribution of redband trout varies according to water years and annual fluctuation of instream flows. During drought years distribution constricts as streams and lakes dry and become uninhabitable. Trout re-colonize these streams during wet cycles, re-expanding the distribution. Many of the large lakes in Warner Valley dried in 1992 and redband trout were found in the lakes before and after the dry period.

Current abundance of adult redband trout in the Warner Lakes is considered relatively low and thought to be dramatically reduced from historical levels. Redband trout are regularly captured in the Warner Lakes but rarely in high numbers. Recent trapnet sampling shows adult redband trout are seldom captured in the lakes, even in high water years. Seasonal passage barriers associated with irrigation diversions and presence of non-native warm water fish in Warner Lakes prohibit redband trout populations from attaining historical levels.

Threatened and Endangered Species

Federally-listed species that may occur in the project vicinity include Warner sucker. The Warner sucker range in the Warner Basin includes the permanent (usually) lakes (Hart, Crump and

Pelican), ephemeral lakes, sloughs, and lower gradient streams. Where once the species was abundant and widely-distributed in the Basin, it now maintains sizable numbers in only a few habitats. Diversions on tributary streams which reduce stream flow and impede migration, nonnative fish in Hart and Crump Lake which prey on young suckers and severe drought since the late 1980's to present represent adverse factors impacting Warner suckers. The presence of large populations of nonnative fishes is believed to limit the recruitment of suckers in the lakes. In recent investigations, the size (age) distribution of lake suckers has been skewed toward larger, older adults.

Habitat use by lake resident suckers (derived from - https://ucmshare.ucmerced.edu/docushare/dsweb/Get/Document-120869/toc.pdf) appears to be similar to that of stream resident suckers in that adult suckers are generally found in the deepest available water where food and cover are plentiful. Not surprisingly, this describes much of the habitat available at Hart, Crump, and Pelican Lakes, as well as the ephemeral lakes north of Hart Lake. Most of these lakes are shallow and of uniform depth, and all have mud bottoms that provide the suckers with abundant food in the form of invertebrates, algae, and organic matter.

Cultural Resources

Cultural resources associated with Native Americans are abundant in southeastern Oregon. Artifacts are especially prevalent around lakes such as Summer and Crump lakes. Human occupation at these locations goes back at least 11,500 years. Sites found in both areas range from large village sites located on the shores of each lake to small camp sites in the adjacent uplands or on playas. Depending upon water levels, sites may be inundated on both lakes, may appear as islands within the lakes or may be located high above the present shoreline. Native Americans with interests in Crump Lake include the Fort Bidwell Tribe, the Burns Paiute Tribe, Paiutes from the Confederated Tribes of Warm Springs, and the Yahuskin Band of the Klamath-Modoc Tribe.

The island proposed for restoration was partially dismantled by artifact hunters circa the 1950's. The lakebed, when dry, is scoured by artifact hunters for points or other artifacts that lie exposed on the surface. Artifact hunters were observed during an early December 2007 site visit on the northern, dry portions of the lakebed.

Socio-Economic Uses

The principal socio-economic use occurring in the Crump Lake area of the Warner Basin relate to raising livestock, harvest of native grass and alfalfa hay, quarrying (limited), recreational fishing for introduced species, principally crappie, recreational hunting and limited wildlife observation activities. A geothermal energy lease is in effect for a private parcel of land on the eastern shore of Crump Lake but has not been developed to date. Highway 140 east from Lakeview, Hogback Ridge Road east from Highway 395 and Lake County roads serve as travel corridors to the remote Warner Basin in south central Oregon. Hart Mountain National Wildlife Refuge, lying northeast of Crump Lake attracts wildlife recreationists to the area. Most of the socio-economic activities in the area occur on lands adjacent to Crump Lake or elsewhere in the Warner Basin. Waterfowl, big game and upland gamebird hunting occurs in the fall on lands throughout or adjacent to the Warner Basin. Hart and Crump Lake provide crappie fishing opportunities, particularly where there is public access to the shorelines.

ENVIRONMENTAL EFFECTS

Soils

Direct impacts to soils will occur from construction activities. The principal impact will result from restoration of the island, covering soils at that location with rock and borrow material hauled to the site from a local quarry. The bulk of the soils present at the island location were bulldozed into shape in 1992 using adjacent lakebed materials. The island restoration impact will be approximately 1.38 acres in extent. Access to the site will primarily be on a constructed haul road stretching across approximately one mile of lakebed. The haul road will entail covering approximately 2.4 acres of the lakebed surface with a geotextile grid/fabric and quarry waste. The geotextile grid/fabric is intended to support the approximately two foot layer of quarry waste to be used as roadbed and prevent or at least lessen pumping of fine grained materials from the lakebed. Four turnouts will be constructed adjacent to the access road to allow for passing of trucks. These turnouts will not add significantly (0.3 acres) to the acreage impacted. Post-construction, the roadbed and turnout material will be removed and re-deposited at a local quarry. The impact of the haul road within the lakebed should be temporary in nature. The haul route on the upland pasture area will be remediated post-construction as necessary. Given dry soils and frozen conditions, impacts to the pasture area are expected to be minimal, e.g. compaction and rutting would be minimized. The local quarry has already been opened, thus most impacts to soil there have already occurred. Some minor overburden removal may occur at the quarry location to expose additional rock. Other than the minor construction impacts identified, no significant impacts to soils are expected.

Sediment/Water Quality

Sediments with contaminate levels of concern are not expected to occur at Crump Lake. The exposed materials at the island location after construction will consist of native rock, which do not pose a concern for contamination and have limited potential for erosion and sediment infill to the lake. Also, construction is anticipated to occur when the lakebed is dry and probably frozen, which coupled with the placement of geotextile fabric and rock, are expected to preclude in-water construction turbidity and sediment concerns.

Vegetation

The willow clump on the remnant island will be covered during construction. No vegetation impacts are associated with the lakebed haul road except at the lake-upland interface where approximately 2000 sq feet of emergent marsh vegetation would be covered by the haul road. Removal of the haul road post-construction is anticipated to lead to recovery of this emergent marsh impact over the course of several years. Some impact to upland grasses in a pastured area may occur from heavy truck traffic. The haul route through the upland zone will avoid shrubs. Localized impacts to small areas of shrubs, grasses and forbs may occur at the local quarry during borrow operations.

Fish and Wildlife Resources

Construction and implementation of the nesting areas will benefit Caspian terns and perhaps other colonial nesting species such as double-crested cormorants, gull species and white pelicans that occur in the Warner Valley by providing suitable nesting habitat. Attraction of Caspian terns to the nesting island will be facilitated by the employment of decoys and a sound system playing Caspian tern vocalizations recorded from an existing colony.

Wildlife resources using Crump Lake and/or adjacent areas are not anticipated to be impacted by the construction action. Most wildlife species are absent from the Crump Lake area during winter. Very limited impacts would be expected to occur from construction traffic on adjacent uplands and the local quarry location as most wildlife species would be absent from these locals. No material will be borrowed from the coarse sand/crushed gravel stockpile thus precluding any impacts to a colony of bank swallows that utilize the vertical face of the stockpile to construct nest burrows.

Fisheries resources in Crump Lake are not anticipated to be impacted from construction actions that occur during winter across a dry, frozen lakebed. Crump Lake provides an adequate prey base for Caspian terns. Establishment of a Caspian tern nesting colony at Crump Lake is not anticipated to noticeably lower the population of any fish species at the lake. Caspian terns nesting at Crump Lake can be anticipated to forage primarily on tui chub, sunfish (crappie and bass), and catfish. Roby et al. (2003) determined that tui chub comprised 53% of the Caspian tern diet at Crump Lake in 2003; sunfish (27%) and catfish (15%) were the other principal prey species. Goldfish, non-salmonids, trout, suckers and other fish species comprised slightly over 5% of their diet in 2003. Tui chub, sunfish and catfish are prolific and should be able to withstand predation from Caspian terns. Overall, no long term negative impacts to biological resources are expected from implementation of this proposal. Colonial nesting bird species are expected to benefit from the proposed action through restoration of a former nesting island.

Threatened and Endangered Species

Biological Assessments (BA) were prepared for the Caspian tern FEIS that addressed listed species in the vicinity of Crump Lake that might be affected by development of nesting habitat for terns or from tern foraging activities on fisheries resources. The USFWS prepared a biological opinion addressing the potential impacts to listed species under their jurisdiction. These documents are available at https://www.nwp.usace.army.mil/pm/e/en_plan_avian.asp.

The USFWS determined the proposed action will not jeopardize the continued existence of the Warner sucker, nor will it affect designated critical habitat. The USFWS expects that development of a nesting colony of Caspian terns at Crump Lake is likely to result in incidental take of Warner sucker in the form of direct mortality, harm and harass or impairment of biological patterns. This take is due to detrimental effects from Caspian terns preying upon Warner sucker in Crump Lake. Up to 21 Warner sucker may be taken as prey due to the increase in nesting habitat. Their determination is based on: 1) the expectation that only a small portion of the total population will be preyed upon by Caspian terns; 2) effects due to construction of nesting habitat will be minimized; 3) Warner sucker preyed upon are expected to be younger age class fish between 0+ and I+ years of age; 4) due to the natural expected high rate of mortality in young fish, the additional mortality of a maximum of 21 Warner sucker each nesting season will not be significant. Take of 21 sucker could represent 0.4 percent of the total estimated population of Warner sucker including stream habitat.

The estimate of Warner sucker mortality is based on an analysis of from an observational study which indicated one capture of an individual Warner sucker out of 1,378 observations of bill loads (Roby et. al. 2003). The estimate most likely represents a worst case situation, in which the single observation is used to predict that an increased population of nesting Caspian terns over a longer period of time. The study was conducted over a twelve week period, observing 71 nesting pairs of Caspian

terns. The prediction assumes a direct relationship of the success of foraging terns would be commensurate with the increased number of nesting birds. Observations made of foraging Caspian terns in the Columbia River suggest that Caspian tern predation rate is not affected by prey availability, at least over the range of values experienced in that study (NOAA 2004). Such observations suggest that the increase in numbers of foraging Caspian terns may not necessarily result in an increase in Warner sucker predation. Additional observations of Caspian tern predation, diet and Warner sucker behavior to avoid predation are necessary to determine actual affects to the Warner sucker population.

The USFWS believes the following reasonable and prudent measures are necessary and appropriate to minimize the incidental take of Warner sucker authorized by their biological opinion:

1. Monitor Caspian terns and other fish eating bird use of the constructed island.

2. Monitor predation by Caspian terns to determine whether take is exceeded due to predation on Warner sucker. Monitoring shall be started as soon as the tern colony reaches a size greater than current conditions support. Based on 2003 data, baseline conditions at Crump Lake will be considered to be 71 nesting pairs.

3. Minimize affects to Warner sucker from operation of dredging equipment while constructing or maintaining the nesting Island.

4. Assess Lake sediment to be used in creating the nesting island to ensure that contaminants will not adversely affect the Warner sucker.

The construction action, as proposed in this Draft EA would not use dredging equipment or lakebed sediments to restore the island in Crump Lake. Therefore reasonable and prudent measures 1 and 2 are the only applicable requirements and they will be implemented.

To implement reasonable and prudent measure number one, the following terms and conditions shall be implemented: 1) Following completion of island construction, monitor Caspian tern and other fish-eating bird use of the newly constructed island during the breeding season.

To implement reasonable and prudent measure number two, the following terms and conditions shall be implemented: 1) Conduct a baseline population estimate of lake dwelling Warner sucker directly affected by Caspian tern predation; 2) Monitor Warner sucker to determine the actual baseline population of Warner suckers in the project area that may be impacted by the proposed action in Hart and Crump Lakes, and stream-resident Warner Suckers in Honey, Deep, and Twentymile Creeks which are tributary to these lakes; 3) Assess size (age) structure, especially evidence of recruitment to the lakes in recent years; and 4) PIT (passive integrated transponder) tag captured suckers to assess growth rates and movements over time. The Corps will provide funding to ODFW in

order to implement terms and conditions for reasonable and prudent measure two. The action will be initiated in early 2008.

Cultural Resources

Based on the construction method and timing, the proposed project would have minimal or no effect on cultural resources. The island site and construction haul road have been inspected by the Bureau of Land Managements cultural resource specialist from the Lakeview, Oregon office. He has furnished a final report to the State Historic Preservation Office. A determination of "no adverse effect" was received from the SHPO in a letter dated February 6, 2008. Site monitoring will be incorporated if determined necessary.

Socio-Economic Uses

Construction activities will not result in any noticeable impact to socio-economic uses in the area. Recreational fish species, given their ability to repopulate and their secondary importance as a food resource for Caspian terns in the area are not expected to incur an appreciable population decline or reduction in sport catch. A temporary increase in sales of local quarry products would occur.

COORDINATION

This Draft EA was distributed for a 30-day public review. Review comments were requested from federal, state, and local agencies, as well as various interested parties. Many of these agencies and parties will be sent a copy of the draft EA, including the following:

U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
National Marine Fisheries Service
Bureau of Land Management - Lakeview
Fort Bidwell Indian Community Council
Burns Paiute Tribe
Klamath Reservation General Council
Confederated Tribes of the Warm Springs Reservation
Oregon State Historic Preservation Office
Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
Oregon Department of Water Resources
Oregon Department of State Lands
Oregon Parks and Recreation Department
Lake County Commissioners
Columbia River Inter-Tribal Fish Commission
Northwest Indian Fisheries Commission
Northwest Power and Conservation Council
Columbia Basin Fish and Wildlife Authority
Columbia River Estuary Study Taskforce
National Audubon Society
Seattle Audubon Society
Portland Audubon Society
American Bird Conservancy
Defenders of Wildlife
The Nature Conservancy
Native Fish Society
Oregon Trout

Federation of Fly Fishers
Salmon for All

One comment on the proposed action was received. That was from the U.S. Fish and Wildlife Service, Bend Field Office. Their comment referenced an island size greater than one surface acre reported in the Draft EA as being larger than that reported in the Final EIS for Caspian tern management. It was determined that the Corps had utilized an improper area formula in the Draft EA and that the surface area of the Crump Lake island, once restored, would not exceed one acre. Their other comments pertained to Reasonable and Prudent Alternatives, Terms and Conditions, and Conservation Measures previously proposed in their biological opinion for the action. The Terms and Conditions, which are non-discretionary, will be implemented to assure compliance with the Endangered Species Act.

CONSULTATION REQUIREMENTS

a. National Environmental Policy Act: This Environmental Assessment satisfies the requirements of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.).

b. Clean Water Act of 1977 (33 USC 1344): The proposed action is in compliance with Section 404 (b)(1) of the Clean Water Act under Nationwide Permit No. 27, which authorizes the construction of small nesting islands. Section 401 Water Quality Certification for Nationwide Permit No. 27 is provided in a letter from the Oregon Department of Environmental Quality dated July 18, 2007.

c. Coastal Zone Management Act of 1972, as amended: Crump Lake does not occur within the Coastal Zone.

d. Endangered Species Act of 1973, as amended: Biological opinions were received from the USFWS and NMFS for the proposed action in the programmatic level EIS. The proposed action may affect, but is not likely to adversely affect, threatened or endangered species under the jurisdiction of USFWS. The Warner sucker was the only species listed by the USFWS for the Crump Lake location. Terms and conditions specified by the USFWS will be implemented by Portland District for Warner suckers.

e. Fish and Wildlife Coordination Act: The proposed action has been coordinated with the USFWS in compliance with this Act. The USFWS was the lead agency for the 2005 *Caspian Tern Management to Reduce Predation of Juvenile Salmonids in the Columbia River Estuary, Final Environmental Impact Statement* (USFWS et al., 2005). The proposed action was developed in concert with the USFWS during the EIS process.

e. Wild and Scenic Rivers Act: Crump Lake is not a Wild and Scenic River.

f. Marine Protection, Research and Sanctuaries Act of 1972, as amended: Crump Lake is an interior Oregon, non-coastal location, thus this act does not pertain.

g. Cultural Resources Acts: Consultation for compliance with Section 106 of the National Historic Preservation Act, as amended, has been completed. Concurrence with a no affect determination was received on February 6, 2008. Cultural resources are located in the project area but will not be impacted by the proposed action.

h. Executive Order 11988, Flood Plain Management, 24 May 1977: The proposed action would occur within Crump Lake, thus within the floodplain, but the approximately 1.5 acre impact would have no adverse effect on flood plains or flood heights.

i. Executive Order 11990, Protection of Wetlands, 24 May 1977: The proposed action would occur within Crump Lake, thus within a wetland, but the approximately 1.5 acre impact would have no adverse effect on wetlands.

j. Analysis of Impacts on Prime and Unique Farmlands: The proposed work would occur within Crump Lake, thus the impact would not affect any prime or unique farmlands.

k. Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The proposed action is not a listed CERCLA site.

l. Migratory Bird Treaty Act: The proposed action would benefit migratory birds.

m. Magnuson-Stevens Fishery Conservation and Management Act (MSA): We received the Biological Opinion and MSA Consultation from the NMFS dated February 16, 2006 for the programmatic FEIS. Recommendations to conserve EFH for coho and Chinook salmon were included as part of the biological opinion. However, no ESA species under the jurisdiction of the NMFS occurs at Crump Lake, Oregon.

n. Clean Air Act: The Clean Air Act of 1970, as amended, established a comprehensive program for improving and maintaining air quality throughout the United States. Its goals are achieved through permitting of stationary sources, restricting the emission of toxic substances from stationary and mobile sources, and establishing National Ambient Air Quality Standards (NAAQS). Title IV of the Act includes provisions for complying with noise pollution standards. The proposed action is in compliance with this act.

o. Native American Graves Protection and Repatriation Act: The Native AmericanGraves Protection and Repatriation Act (NAGPRA) provides for the protection of Native American and Native Hawaiian cultural items, established ownership and control of Native American cultural items, human remains, and associated funerary objects to Native Americans. It also establishes requirements for the treatment of Native American human remains and sacred or cultural objects found on federal land. This Act also provides for the protection, inventory, and repatriation of Native American cultural items, human remains, and associated funerary objects. Any discoveries will be handled according to Portland District policy.

p. The Bald and Golden Eagle Protection Act: As described above there will be no impacts to bald eagle or their habitat from implementation of this project. No nesting habitat is located at the project construction site.

q. Executive Order 12898, Environmental Justice: This executive order requires federal agencies to consider and minimize potential impacts on subsistence, low-income or minority communities. The goal is to ensure that no person or group of people should shoulder a disproportionate share of the negative environmental impacts resulting from the execution of this country's domestic and foreign policy programs. This proposed action is in compliance with Executive Order 12898.

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